CLAIMS

What Is Claimed Is:

1. A combination of (a) a hydrogen getter for gettering hydrogen evolved from packaging materials employed in a device comprising hermetically-sealed GaAs integrated circuitry employing at least one interconnect frame and (b) an EMI shield for shielding internal signals, comprising:

(a) a layer of an electrically conductive metal for providing electro-magnetic interference shielding, formed on surfaces of said interconnect frame;

(b) a layer of titanium for absorbing and chemically binding up said hydrogen, formed on said layer of electrically conductive metal; and

(c) a layer of palladium for preventing oxidation of said titanium, but permeable to said hydrogen, formed on said layer of titanium.

2. The combination of Claim 1 wherein said titanium has a total mass larger than that given by the following equation:

$$M_{Ti} > \frac{20\, Q_{eff} T_L}{134\, Torr \cdot cm^3 \cdot mg^{-1}}$$

where M_{Ti} is the mass of titanium, Q_{eff} is the rate of hydrogen production from said packaging materials, and T_L is a specified lifetime of said device, and wherein said palladium has a thickness of about 2,000 to 6,000 Å.

3. The combination of Claim 1 wherein said layer of said electrically conductive metal has a thickness ranging from 5 to 6 skin depths of wave propagation media.

4. The combination of Claim 3 wherein said electrically conductive metal is selected from the group consisting of aluminum and copper.

5. The combination of Claim 4 wherein said layer of said electrically conductive metal comprises aluminum and wherein said hydrogen getter further includes a layer of titanium for adhering said aluminum layer to said surface of said interconnect frame.

6. The combination of Claim 5 wherein said adhering layer of titanium has a thickness of about 20 nm.

7. A method for fabricating a combination of (a) a hydrogen getter for gettering hydrogen evolved from packaging materials employed in a device comprising hermetically-sealed GaAs integrated circuitry employing at least one interconnect frame and (b) an EMI shielding for shielding internal signals, said method comprising:

(a) forming a layer of an electrically conductive metal for providing electromagnetic interference shielding on surfaces of said interconnect frame;

(b) vacuum-depositing a layer of titanium for absorbing and chemically binding up said hydrogen, formed on said layer of electrically conductive metal; and

(c) vacuum-depositing a layer of palladium for preventing oxidation of said titanium, but permeable to said hydrogen, on said layer of titanium, said vacuum deposition of both said titanium layer and said palladium layer being done sequentially during a single coating run to thereby prevent oxidation of said titanium layer.

8. The method of Claim 7 wherein said titanium has a total mass larger than that given by the following equation:

$$M_{Ti} > \frac{20\, Q_{eff} T_L}{134\, Torr \cdot cm^3 \cdot mg^{-1}}$$

where M_{Ti} is the mass of titanium, Q_{eff} is the rate of hydrogen production from said interconnect frame, and T_L is a specified lifetime of said device, and wherein said palladium has a thickness of about 2,000 to 6,000 Å.

9. The method of Claim 7 wherein said layer of said electrically conductive metal has a thickness ranging from 5 to 6 skin depths of wave propagation media.

10. The method of Claim 9 wherein said electrically conductive metal is selected from the group consisting of aluminum and copper.

11. The method of Claim 10 wherein said layer of said electrically conductive metal comprises aluminum and wherein said hydrogen getter further includes a layer of titanium for adhering said aluminum layer to said surface of said interconnect frame.

12. The method of Claim 11 wherein said adhering layer of titanium has a thickness of about 20 nm.

13. The method of Claim 10 wherein said layer of electrically conductive material comprises copper and is electroless-deposited on said surface of said interconnect frame.

14. A hydrogen getter for gettering hydrogen evolved from packaging materials employed in a transmit/receive module configured to transmit and receive electromagnetic radiation over a predetermined portion of the electromagnetic spectrum, said transmit/receive module comprising a least one frame component formed as a single piece from a synthetic resin dielectric material, said frame component configured to support a plurality of electrical connectors, said hydrogen getter comprising a thin film coating on at least one surface of said frame component, said thin film coating comprising:

(a) a layer of titanium for absorbing and chemically binding up said hydrogen, formed on said at least one surface ; and

(b) a layer of palladium for preventing oxidation of said titanium, but permeable to said hydrogen, formed on said layer of titanium.

15. The hydrogen getter of Claim 14 wherein said titanium has a total mass larger than that given by the following equation:

$$M_{Ti} > \frac{20\, Q_{eff} T_L}{134\, Torr \cdot cm^3 \cdot mg^{-1}}$$

where M_{Ti} is the mass of titanium, Q_{eff} is the rate of hydrogen production from said packaging materials, and T_L is a specified lifetime of said transmit/receive module, and wherein said palladium has a thickness of about 2,000 to 6,000 Å.

16. The hydrogen getter of Claim 14 further including a layer of an electrically conductive metal for providing electro-magnetic interference shielding, formed between said layer of titanium and said surface of said frame component.

17. The hydrogen getter of Claim 16 wherein said layer of said electrically conductive metal has a thickness ranging from 5 to 6 skin depths of wave propagation media.

18. The hydrogen getter of Claim 17 wherein said electrically conductive metal is selected from the group consisting of aluminum and copper.

19. The hydrogen getter of Claim 18 wherein said layer of said electrically conductive metal comprises aluminum and wherein said hydrogen getter further includes a layer of titanium for adhering said aluminum layer to said surface of said frame component.

20. The hydrogen getter of Claim 19 wherein said adhering layer of titanium has a thickness of about 20 nm.